Amendments to the Claims:

Claims 1-63 **(Cancelled)**.

64. **(Previously Presented)** A method of generating plasma within a vacuum chamber and processing a substrate placed on a substrate electrode within the vacuum chamber, the method comprising:

generating the plasma by radiating electromagnetic waves into an interior of the vacuum chamber via a dielectric window positioned opposite the substrate by supplying power having a frequency of 50 MHz to 3 GHz to an antenna while maintaining the interior of the vacuum chamber at a specified pressure by introducing gas into the vacuum chamber and simultaneously evacuating the interior of the vacuum chamber; and

processing the substrate using the generated plasma while controlling plasma distribution on the substrate using a single annular groove arranged at the dielectric window so that an outer-side face of the annular groove is located inside of an inner surface of a sidewall of the vacuum chamber, and so that the annular groove has a groove width in a range of 3 mm to 50 mm.

65. **(Previously Presented)** The plasma processing method of claim 64, wherein a surface area of the dielectric window located inside the groove is 0.5 to 2.5 times that of the substrate.

66. **(Currently Amended)** A method of generating plasma within a vacuum chamber and processing a substrate placed on a substrate electrode within the vacuum chamber, the method comprising:

generating the plasma by radiating electromagnetic waves into an interior of the vacuum chamber via a dielectric window positioned opposite the substrate by supplying power having a frequency of 50 MHz to 3 GHz to an antenna while maintaining the interior of the vacuum

chamber at a specified pressure by introducing gas into the vacuum chamber and simultaneously evacuating the interior of the vacuum chamber; and

processing the substrate using the generated plasma while controlling plasma distribution on the substrate using an annular groove arranged outside an outer edge of a vacuum chamber wall portion of the dielectric window so that an outer-side face of the annular groove is located inside of an inner surface of a sidewall of the vacuum chamber, and so that a surface area inside of the annular groove including the dielectric window is 0.5 to 2.5 times as large as a surface area of the substrate, and so that the annular groove has a groove width in a range of 3 mm to 50 mm.

67. **(Currently Amended)** The plasma processing method of claim 66, wherein the annular groove is formed by an upper wall of the vacuum chamber and an outer side wall of the vacuum chamber wall portion of the dielectric window.

Claims 68-75 **(Cancelled)**.

76. **(Previously Presented)** A plasma processing apparatus comprising:

a vacuum chamber having an upper inner surface opposite a substrate to be placed in said vacuum chamber, and having a sidewall;

a gas supply device for supplying gas into said vacuum chamber;

an evacuating device for evacuating an interior of said vacuum chamber;

a substrate electrode for supporting the substrate within said vacuum chamber;

a dielectric window arranged opposite said substrate electrode;

a single annular groove arranged at said dielectric window so that an outer-side face of said annular groove is located inside an inner surface of said sidewall of said vacuum chamber, said annular groove having a groove width in a range of 3 mm to 50 mm;

an antenna for radiating electromagnetic waves into said vacuum chamber via said dielectric window; and

a high-frequency power supply source for supplying power having a frequency of 50 MHz to 3 GHz to said antenna.

77. **(Previously Presented)** The plasma processing apparatus of claim 76, wherein a surface area of said dielectric window located inside said annular groove is 0.5 to 2.5 times as large as a surface area of the substrate.

78. **(Currently Amended)** A plasma processing apparatus comprising:

a vacuum chamber having an upper inner surface opposite a substrate to be placed in said vacuum chamber, and having a sidewall;

a gas supply device for supplying gas into said vacuum chamber;

an evacuating device for evacuating an interior of said vacuum chamber;

a substrate electrode for supporting the substrate within said vacuum chamber;

a dielectric window arranged opposite said substrate electrode;

an annular groove arranged outside an outer edge of a vacuum chamber wall portion of said dielectric window so that an outer-side face of said annular groove is located inside of an inner surface of said sidewall of said vacuum chamber, and so that a surface area inside of said annular groove including said dielectric window is 0.5 to 2.5 times as large as a surface area of the substrate, said annular groove having a groove width in a range of 3 mm to 50 mm;

an antenna for radiating electromagnetic waves into said vacuum chamber via said dielectric window; and

a high-frequency power supply source for supplying power having a frequency of 50 MHz to 3 GHz to said antenna.

79. **(Currently Amended)** The plasma processing apparatus of claim 78, wherein said annular groove is formed by an upper wall of said vacuum chamber and an outer side wall of said vacuum chamber wall portion of said dielectric window.

80. **(New)** The plasma processing method of claim 64, wherein said controlling of the plasma distribution on the substrate using the single annular groove comprises generating a hollow cathode discharge in the single annular groove by supplying power having the frequency of 50 MHz to 3 GHz to the antenna.

81. **(New)** The plasma processing method of claim 66, wherein said controlling of the plasma distribution on the substrate using the annular groove comprises generating a hollow cathode discharge in the annular groove by supplying power having the frequency of 50 MHz to 3 GHz to the antenna.

82. **(New)** The plasma processing apparatus of claim 76, wherein said high-frequency power supply source, said antenna, and said single annular groove are shaped and arranged so as to be operable to generate a hollow cathode discharge in said single annular groove by supplying power having the frequency of 50 MHz to 3 GHz to said antenna.

83. **(New)** The plasma processing apparatus of claim 78, wherein said high-frequency power supply source, said antenna, and said annular groove are shaped and arranged so as to be operable to generate a hollow cathode discharge in said annular groove by supplying power having the frequency of 50 MHz to 3 GHz to said antenna.